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# Sea Turtle Management Progress of Pangumbahan Beach, Sukabumi District, West Java-Indonesia

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## ABSTRACT

Pangumbahan Beach, located in Sukabumi District, West-Java Province has been appointed a conservation area for the green turtle (*Chelonia mydas*) in Indonesia. Recently, the Local Government of Sukabumi District has taken measures to manage the beach as a “Coastal Park” in order to promote sea turtle conservation. In context, the development of green turtle conservation has been managed as follows: management activity started in 1907 under license from the Dutch Colonial Government. The management implementation was initiated effectively in 1957 using an auction system, with a total management area of 12,300 m<sup>2</sup> established. In 1989, the area of Pangumbahan at about 115 ha, with its 3,000m long and 500m wide beach, was determined to be under the rightful management of the Marine Affairs and Fisheries Service of Sukabumi District. During this period, the technical sea turtle management has been implemented by a private company. From the beginning of April 2008 to the present, the management of the beach has been taken over by the Sukabumi District Government which charges the Marine Affairs and Fisheries Service as responsible for managing the park. The positive impact appears in several indicators including data gathering, non utilisation of eggs for any purpose, improvement of hatching rate, an increase in hatchling numbers released into the sea and open access for visitors, which tends to increase year by year. This positive management example would be valuable to turtle conservation in Indonesia.

**KEYWORDS:** sea turtle, management progress, Pangumbahan Beach

## INTRODUCTION

Indonesia, which consists of approximately 17,500 islands has over 81,000km of total coastline, benefits turtles by providing a wide choice of habitats, especially for nesting. There are six species that have been identified in Indonesian waters. The species are leatherback, olive ridley, hawksbill, loggerhead, flatback and green turtles. The flatbacks nest exclusively in Australia but have been observed feeding in Indonesian waters (Kitchener 1996).

The number of many larger rookeries has decreased in the last 50 years, due to over harvesting (Schulz, 1984; Salm, 1984; Kitchener, 1996) and habitat degradation (Wiadnyana, 2003). Therefore, it will be important to maintain and effectively manage the remaining rookeries such as that at Pangumbahan Beach. This well-known beach located in West Java is one of the major turtle nesting beaches in Indonesia and the only remaining nesting beach of any importance on the island. At this beach, green turtles are the main species coming ashore to nest.

Despite this, there are several known nesting sites for green turtle species throughout the Berau District of East Kalimantan Province including those in Derawan, Sangalaki, Semana, Mataha, Belambangan, Bilang-Bilangan, Balikpapan and Sambit islands; and East Java such as Sukamade Beach. Sometimes Kakaban Island, located off the southern part of Sangalaki Island, has also been used by this green turtle species when nesting their eggs. This is despite nests often becoming inundated or covered by the high tide so that the embryos buried inside the nests. Since January 2002, the Local Government of Berau District has stopped the concession activity and declared the Sangalaki Island and Derawan Island as an important, protected nesting site resulting in good progress being made in sea turtle management (Dermawan, 2002). A similar case occurred at Pangumbahan Beach where the Local Government of Sukabumi District declared Pangumbahan Beach a “Coastal Park” to aid in the development of sea turtle conservation in 2009.

For the time being, Pangumbahan beach is under the management of the Local Government of Sukabumi District. The Chief of Sukabumi District has charged the Marine Affairs and Fisheries Service with responsibility for management operations. This institution works in collaboration with universities, research institutes, non-government organizations and other institutions with an interest in the areas conservation management. Many changes are occurring to improve the performance of sea turtle management at Pangumbahan Beach. This paper describes the progress of sea turtle conservation in this recent period of

management under the Local Government of Sukabumi District.

## MATERIALS AND METHODS

Several surveys were conducted at Pangumbahan Beach, Sukabumi District to gather data and information on the ecological nesting site, egg collecting activity, hatchling production, hatchlings release activity and visitors. Pangumbahan Beach is located in Gunung Batu Village, District Ciracap, Sukabumi, with a geographic position of 7° 17' 08" - 7° 21' 50" S and 106° 23' 40" - 106° 24' 10" E (Fig. 1). Pangumbahan Beach is comprised of a broad management area measuring approximately 58.43 ha is 2.8 km long, divided into six observation posts. The distance between posts is about 400m, except for posts 1 and 3 which have a length of 600m. The average width of the beach is 200-250m.

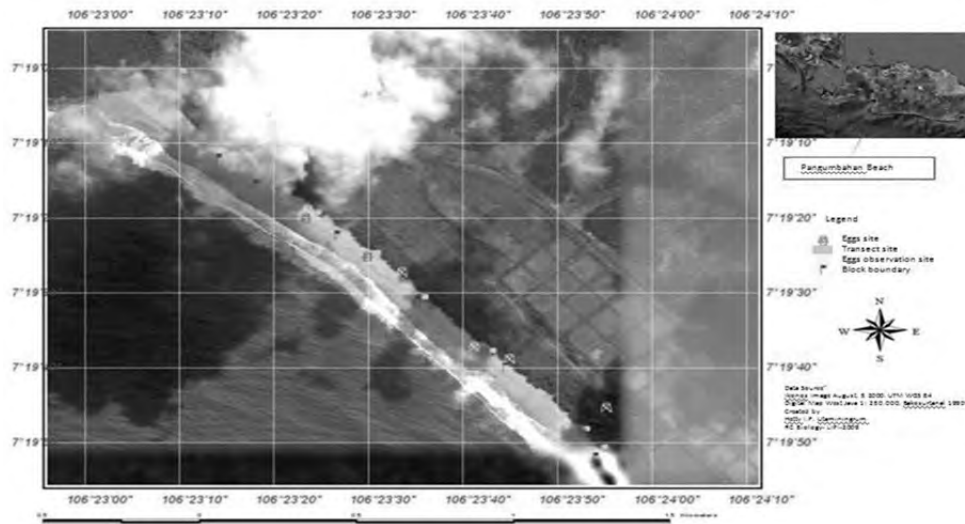


Fig 1. Pangumbahan Beach with long area for green turtle nesting in Sukabumi District.(Nastiti *et al.*, 2009).

Data on the ecology of the nesting sites were found from previous research activities that were reported as technical reports. Data on egg and hatchling production, as well as the number of visitors to the area were gathered from the Marine Affairs and Fisheries Service of Sukabumi District.

## RESULTS AND DISCUSSION

### Nesting Site Condition

Pangumbahan Beach constitutes a suitable nesting site for sea turtles. The main turtle frequenting the beach is the green turtle (Dermawan, 2002; Wiadnyana, 2003). The beach, at 200-250m in width, is formed of soft, white sand with a grain size measuring 0.025mm. The width of the beach forms an average slope of 5.3°. This area has a different horizontal tidal land, averaging 53.67m when measured from the lowest low tide to high tide limit (Anonymous, 2007; 2008). These conditions may support the turtle's ability to reach the upper beach site for nesting. The existence of some varieties of beach vegetation also contributes to the beach becoming a quiet nesting site. The dominant beach vegetation is sea pandan (*Pandanus tectorius*) that grows along the beach, so this beach vegetation may protect the turtle eggs when laid. According to Roemantyo *et al.* (2011), the vegetation composition of Pangumbahan Beach is divided into two layers; the first layer is composed of *Ipoemoea pes-caprae* (L.) R.Br. and *Spinifex littorius* (Burm. f.) Merr, whereas the second layer of vegetation is composed of *Pandanus tectorius* Parkinson ex Zucc., *Crinum asiaticum* L. and *Callotropis gigantea* (L.) W.T. Aiton. This second layer plays an important role in turtle nesting.

### Brief History of Turtle Management in Pangumbahan Beach Before 1973

It has been realized that the turtle is an animal which needs to be protected because of its long life span and slow growth rate. Therefore, humans must ensure its existence by providing managed areas which can be used for nesting. The awareness of the need for turtle management began in 1907 under license from the Dutch Colonial Government. Management of green turtles was effectively initiated in 1957 and implemented using a tender system; the total conservation area established measured about 12,300m<sup>2</sup> (1.2 ha).

### During 1973- 2008

During this period, when the conservation area was determined by local government in 1989, the Pangumbahan beach area for turtle conservation was only 115ha in size, with a beach length of 3,000m and width of 500m. The Marine Affairs and Fisheries Service had rights over the management of the area. The technical turtle management was implemented by CV Daya Bakti under a system of cooperating agreements or concessions (Table 1).

Table 1. Concession period for CV Daya Bakti licensed by the Marine Affairs and Fisheries Service of West Java Province

No	Concession Period	Sources of Management License	Management Description
1	1973-1979	Managing License by the Chief of Sukabumi District. The license had to be renewed every year	Management system for turtle eggs was by the authority of concession holder
2	1980-1990	Managing License by the Chief of Sukabumi District with a concession term of 10 years	Management system for turtle eggs was by the authority of concession holder
3	1990-2001	Managing License by Governor of West Java with a concession term of 10 years	Management system for turtle eggs was by the authority of concession holder
4	2001-2005	Managing License in form of Implementing Agreement No. PK No.660.1/Pj-3-Huk/2002 between CV Daya Bakti and the Chief of Sukabumi District	Management system determined: 70% of turtle eggs used by the concession holder and 30% of eggs for conservation purpose (tax liability of Rp 10/egg)
5	2005-2008	Managing License was followed to District Regulation No. 16/2005	Management system determined: 50% of turtle eggs used by the concession holder and 50% of eggs for conservation purpose (no tax liability)

Source: Marine and Fisheries Service of West Java Province (Nastiti *et al.*, 2009).

Management activity included the monitoring of sea turtle populations (collecting, sorting, semi-natural hatching in small jars and stocking on a regular basis), as well as the maintenance of the turtle nesting habitat. So far, efforts have gone well. In one year, an average of 94,000 eggs was collected and about 6,500–17,500 eggs were hatched. Despite this, the evaluation of the survival rate of hatchlings released needs to be examined deeply. Based on data collected over 7 years (2001-2007), the number of eggs collected from Pangumbahan Beach ranged from 63,623 to 100,822, with an average of 91,616 eggs a year (Table 2). Of this number of eggs, the concession holder (CV Daya Bakti) produced ready stock hatchlings between 6,700-30,360 individuals or at an annual average of 19,864 individuals. The release of hatchlings was completed 3-12 times a year and the number of hatchlings released ranged between 2,800 -15,360 individuals. So, it can be concluded that over a period of 7 years (2001-2007) the number of successfully collected turtle eggs stands at 549,693 and around 119,185 individual hatchlings, representing 21.68% of the total eggs collected, were produced. Stocking activities are usually carried out by the manager, witnessed by a designated agency officer (TPI), village officials and local community leaders. In some cases, the release of hatchlings was done together with special events, such as the visiting ceremony of the Chief of Sukabumi Regency, the Governor of West Java Province, as well as international guests.

Table 2. The progress of the number of eggs produced and hatchlings released at Pangumbahan Beach

during 2001 – 2007

Year	The number of eggs	Number of Hatchlings Released (individual)	Percentage of Hatching
2001	96,401	17,500	18.15
2002	100,822	6,700	6.64
2003	88,859	21,100	23.74
2004	99,199	29,575	29.81
2005	100,789	13,950	13.84
2007	63,623	30,360	47.72
Total	549,693	119,185	21.68
Average / year	91,616	19,864	

#### After 2008 to present

Since April 2008, the management of the turtle conservation area at Pangumbahan Beach has been taken over by the Government of Sukabumi District based on an implementing agreement between the District Government and CV Daya Bakti No. 660.1/PJ.3425-HUK/2008 - No: 29/DB-UPP/XII/2008, dated December 18, 2008. The decree designated the Marine Affairs and Fisheries Service of Sukabumi, as the authority manager of turtle conservation at Pangumbahan Beach (Chief of Sukabumi District Decree No. 523 / Kep.638/Dislutkan/2008).

Furthermore, within the framework establishing the Regional Marine Protected Area, referring to National Law No 27/2007 concerning Management of Coastal Areas and Small Islands, the Chief of Sukabumi District issued decree No. 523/Kep.639-Dislutkan/2008. This concerned the Turtle Beach area of Pangumbahan being declared a Coastal Conservation Area and gave the Small Islands of Sukabumi District the status "Coastal Park" as "Turtle Centers" (Pangumbahan Turtle Park) on December 22, 2009. For effective operation in the field, The Head of Marine Affairs and Fisheries Service appointed some of the officers involved in the turtle management at Sukabumi Beach including the Head of the Surveillance of Marine Resources and Fisheries as task force leader, a field coordinator, four field supervisors, 12 employees for daily egg collecting, hatching and hatchling release activities and five tour guides (Sukabumi District Government, 2011).

#### Management Progress

At the beginning of the period of take-over, from the private company to Local Government, of the Pangumbahan nesting beach, the data on the turtle management were still incomplete. The good data which is available began in August 2008. Fig.2 shows the trend of the number of sea turtles nesting at Pangumbahan Beach. The highest number of individual nesters, 3,160, was noted in 2008. The number of nesters landing seems be stable at around 1,500 individuals during the next three years.

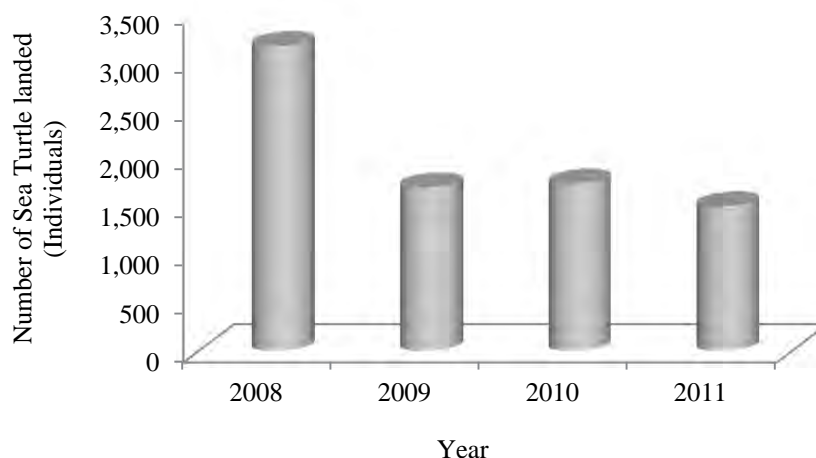


Fig. 2. Trend in the number of sea turtles nesting at Pangumbahan Beach, 2008 – 2011.

In terms of egg collection, this coincides with the number of sea turtle landing from 2008 – 2011 (Fig. 3). The eggs collected reached a maximum value of around 320,000 eggs in 2008. After that, the number of eggs collected remains stable at around 140,000 eggs each year.

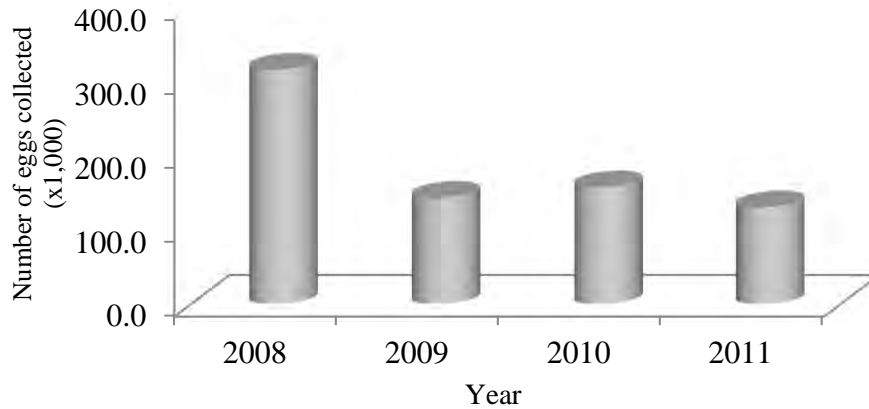


Fig. 3. Trend in number of eggs collected at Pangumbahan Beach, 2008 – 2011.

Under the management of local government, there is no more utilization of eggs for any reason unlike with previous management under the private company. From eggs hatched, Fig. 4 shows the fluctuation in the number of hatchlings released from 2008 – 2011. The higher number of about 165,000 released hatchlings appeared in 2009.

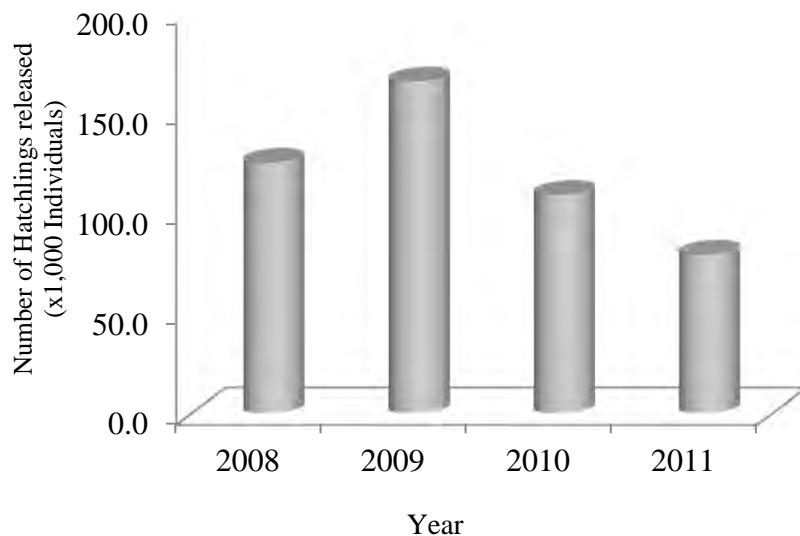


Fig. 4. Trend in number of hatchling released at Pangumbahan Beach, 2008 – 2011.

Comparing the data from 2001 – 2007 (7 years of management under private company) and 2008 – 2011 (close to four years after the taken over by Sukabumi District Government), it is clear that the total number of eggs collected at Pangumbahan Beach was 749,000 after only four years. This increases by around 1.4 times during the period of 2008 – 2011 than compared with the period, 2001 – 2007. This increase in hatching success of between 80-84% has been achieved and is compared to previous hatching activity that only achieved a success rate of 21.68% (Table 2). A similar case has occurred with the number of hatchlings released over the last four years, with 479,300 individuals released (4.0 times higher than the period of under the concession of the private company). This shows the awareness of the government and indicates good progress of the turtle management at Pangumbahan nesting beach. This practice of careful data collection would serve well in the future when evaluating the status of turtle landing and nesting at Pangumbahan Beach.

The positive impact of the current management under local government is seen in the data gathered starting in August, 2008. Fig. 4 represents the fluctuation of the number of nesters landed at Pangumbahan Beach, where a large peak occurred in October 2008. Generally, it seems that the best season for turtle nesting at Pangumbahan Beach occurs during the period September – November, whereas the low season occurs from April to June.

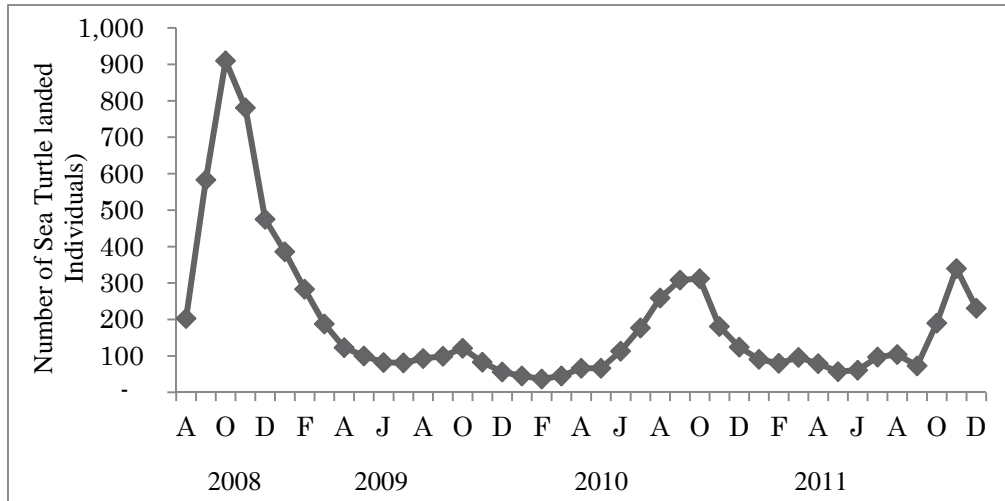


Fig. 4. Variation of turtles landed at Pangumbahan Beach, 2008 – 2011.

The current sea turtle management at Pangumbahan Beach is making good progress in attracting visitors from year to year (Fig. 5). In early 2008, less than 1,500 people visited the area. The visitors tend to increase each year, eventually reaching 21,759 people in 2011 (15 times the number of visitors). This is due to opening the beach to the people who want to witness the turtles landing during the night. Two observation posts as near to the nesting sites as is practical are available for visitors. This positive trend in the increase of visitors would, in fact, increase the income for local people who provide the transportation throughout the night and sell basic supplies to the visitors. The nesting beach of Pangumbahan also serves as a place for research and field study, for the marriage rituals of specific ethnic groups and as the subject of coverage in various print and electronic media in Indonesia.

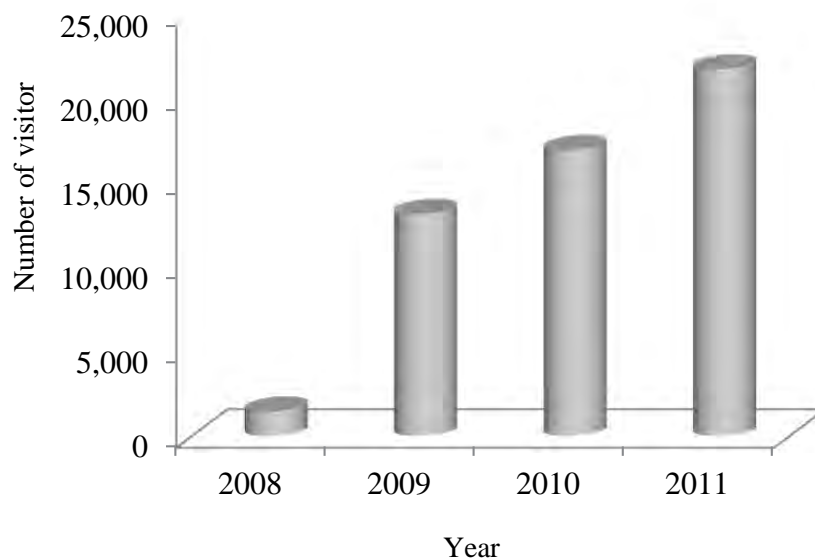


Fig. 5. Trend of people visiting Pangumbahan Beach, 2008 – 2011.

## CONCLUSION

Pangumbahan Beach, known as the largest nesting site for green turtles in West Java, has been established as a “Coastal Park” and has been effectively managed by the Local Government of Sukabumi District since August 2008. The progress of management can be seen in their data gathering, the non utilisation of eggs for any purpose, improvement in the hatching rate, increase in the number of hatchlings released to the sea and in the opening of access to visitors, who are increasing in number year by year. Eco-tourism is developing well and provides a positive impact by providing a source of income for the local communities. This area is also suitable for researchers and students seeking to conduct research activities and as an subject of print and electronic media coverage. This positive management measure would be appreciated well by turtle conservationists in Indonesia.

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